or oral inoculation, by which, with any conventional methods, sufficient immunological effects are not expectable. In addition, as seen in the Examples, the vaccines in accordance with the present invention are excellent in inducing local immunity, cellular immunity, and such which were problems difficult to overcome with publicly known adjuvants. Moreover, it is also possible to utilize natural toxins as safe adjuvants according to the present invention. Thus, because of the simplicity, the invention is easily applicable to the vaccine as compared with approaches of generating mutant toxins.

CLAIMS

1. An adjuvant comprising an attenuated toxin having a residual toxic activity of less than one-two thousandth (<1/2000) that of the natural toxin corresponding thereto, prepared by attenuating the natural toxin having serine residues, glutamic acid residues, and lysine residues in its amino acid sequence, or by attenuating a subunit thereof.

2. The adjuvant of claim 1, wherein said toxin is a mutant having an amino acid sequence of the corresponding natural toxin wherein one or more amino acid residues are substituted, inserted, deleted, and/or added, and having an adjuvant activity.

3. The adjuvant of claim 1, wherein said toxin is a natural toxin.

4. The adjuvant of any of claims 1 to 3, wherein said toxin is a bacterial toxin.

5. The adjuvant of claim 4, wherein said toxin is selected from the group consisting of cholera toxin, pertussis toxin, heat-labile toxin of pathogenic *E. coli*, Staphylococcus α toxin and β toxin, and thermostable hemolytic toxin of *Vibrio parahaemolyticus*.

6. The adjuvant of claim 5, wherein said toxin is a natural cholera toxin having a residual toxic activity of less than one-two thousandth (1/2000) that of said corresponding natural toxin, prepared by attenuating a natural cholera toxin with formalin treatment.

7. The adjuvant of claim 6, wherein said residual toxic activity is less than one-ten thousandth (1/10,000) that of said corresponding natural toxin.

8. A vaccine preparation comprising the adjuvant of any one of claims 1 to 7 and one or more vaccine antigens.

9. The vaccine preparation of claim 8, wherein said vaccine preparation is formulated for intranasal administration.

10. The vaccine preparation of claim 8, wherein said vaccine preparation is formulated for oral administration.

11. The vaccine preparation of claim 8, wherein the vaccine preparation is formulated for percutaneous administration.

12. The vaccine preparation of claim 8, wherein said vaccine

comprises one or more antigens from one or more pathogenic microorganisms, said microorganisms selected from the group consisting of influenza virus, rotavirus, measles virus, rubella virus, mumps virus, AIDS virus, *Bordetella pertussis*, diphtheria bacillus, *Helicobacter pylori*, enterohaemorrhagic *Escherichia coli* (EHEC), *Chlamydia*, *Mycoplasma*, Malaria parasite, coccidium protozoa, and schistosome.